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**SCIENTIFIC COUNCIL MEETING – JUNE 2002**

**Fisheries Commission's Request for Scientific Advice on Management in 2003  
of Certain Stocks in Subareas 3 and 4**

1. The Fisheries Commission with the concurrence of the Coastal State as regards the stocks below which occur within its jurisdiction, requests that the Scientific Council, at a meeting in advance of the 2002 Annual Meeting, provide advice on the scientific basis for the management of the following fish and invertebrate stocks or groups of stocks in 2003:

Redfish (Div. 3M)  
Shrimp (Div. 3M, 3LNO)  
Greenland halibut (Subarea 2 and Div. 3KLMNO)  
Capelin (Div. 3NO)

2. The Fisheries Commission with the concurrence of the Coastal State as regards the stocks below which occur within its jurisdiction, requests that the Scientific Council, at a meeting in advance of the 2002 Annual Meeting, provide advice on the scientific basis for the management of the following fish stocks on an alternating year basis:

Cod (Div. 3NO; Div. 3M)  
Redfish (Div. 3LN)  
Yellowtail flounder (Div. 3LNO)  
American plaice (Div. 3LNO; Div. 3M)  
Witch flounder (Div. 2J3KL; Div. 3NO)  
Squid (Subareas 3 and 4)

- In 2001, advice was provided for 2002 and 2003 for cod in 3NO, witch flounder in 2J3KL and redfish in 3LN. These stocks will next be assessed in 2003.
- In 2001, advice was provided for 2002 and 2003 for American plaice in 3LNO. The Fisheries Commission with the concurrence of the Coastal State, requests Scientific Council in advance of the 2002 Annual Meeting, to conduct a full analytical assessment of American plaice in Div. 3LNO and to review its advice for 2003. Scientific Council is further requested to analyse and comment on the precision of the estimates of the recent increase in fishing mortality. The next assessment will then take place in 2003 as per the alternate year schedule.
- In 2002, advice will be provided for 2003 and 2004 for cod in 3M, American plaice in 3M, yellowtail flounder in 3LNO, witch flounder in 3NO and squid in SA 3 & 4. These stocks will next be assessed in 2004.

The Fisheries Commission requests the Scientific Council to continue to monitor the status of all these stocks annually and, should a significant change be observed in stock status (e.g. from surveys) or in by-catches in other fisheries, provide updated advice as appropriate.

3. The Commission and the Coastal State request the Scientific Council to consider the following in assessing and projecting future stock levels for those stocks listed above:
  - a) The preferred tool for the presentation of a synthetic view of the past dynamics of an exploited stock and its future development is a stock assessment model, whether age-based or age-aggregated.

- b) For those stocks subject to analytical-type assessments, the status of the stocks should be reviewed and management options evaluated in terms of their implications for fishable stock size in both the short and long term. As general reference points, the implications of fishing at  $F_{0.1}$  and  $F_{2001}$  in 2003 and subsequent years should be evaluated. The present stock size and spawning stock size should be described in relation to those observed historically and those expected in the longer term under this range of options.
- c) For those stocks subject to general production-type assessments, the time series of data should be updated, the status of the stock should be reviewed and management options evaluated in the way described above to the extent possible. In this case, the general reference points should be the level of fishing effort or fishing mortality (F) which is calculated to be required to take the MSY catch in the long term and two-thirds of that effort level.
- d) For those resources for which only general biological and/or catch data are available, few standard criteria exist on which to base advice. The stock status should be evaluated in the context of management requirements for long-term sustainability and the advice provided should be consistent with the precautionary approach.
- e) Spawning stock biomass levels considered necessary for maintenance of sustained recruitment should be recommended for each stock. In those cases where present spawning stock size is a matter of scientific concern in relation to the continuing reproductive potential of the stock, management options should be offered that specifically respond to such concerns.
- f) Information should be provided on stock size, spawning stock sizes, recruitment prospects, fishing mortality, catch rates and TACs implied by these management strategies for the short and the long term in the following format:
- I. For stocks for which analytical-type assessments are possible, graphs of all of the following for the longest time-period possible:
    - historical yield and fishing mortality;
    - spawning stock biomass and recruitment levels;
    - catch options for the year 2003 and subsequent years over a range of fishing mortality rates (F) at least from  $F_{0.1}$  to  $F_{max}$ ;
    - spawning stock biomass corresponding to each catch option;
    - yield-per-recruit and spawning stock per recruit values for a range of fishing mortalities.
  - II. For stocks for which advice is based on general production models, the relevant graph of production as a function of fishing mortality rate or fishing effort. Age-aggregated assessments should also provide graphs of all of the following for the longest time-period possible:
    - exploitable biomass (both absolute and relative to  $B_{MSY}$ )
    - yield/biomass ratio as proxy for fishing mortality (both absolute and relative to  $F_{MSY}$ )
    - estimates of recruitment from surveys, if available.
  - III. Where analytical methods are not attempted, the following graphs should be presented, for one or several surveys, for the longest time-period possible:
    - time trends of survey abundance estimates, over:
      - an age or size range chosen to represent the spawning stock (SSB)
      - an age or size-range chosen to represent the fishable stock biomass
    - recruitment proxy or index for an age or size-range chosen to represent the recruiting population.
    - fishing mortality proxy, such as the ratio of reported commercial catches to a measure of the fishable stock.

For age-structured assessments, yield-per-recruit graphs and associated estimates of yield-per-recruit based reference points should be provided. In particular, the three reference points, actual F,  $F_{0.1}$  and  $F_{max}$  should be shown.

- g) For shrimp in Div. 3M, including the area in footnote 1 of Part I, G of the Conservation and Enforcement Measures (the 3L 'box'), Scientific Council is requested, in advance of the annual NAFO Meeting of September 2002, to provide information on the monthly distribution of shrimp by size as taken in the commercial fishery and to comment on these distributions in relation to the closed area of Div. 3M as defined by co-ordinates in footnote 2 of Part I, G of the Conservation and Enforcement Measures and the

consequences to the stock of the following scenarios: a) closure of the area during June 1 through December 31, and b) no closure at any time.

4. Noting the progress made by the Scientific Council on the development of a framework for implementation of the Precautionary Approach, the Fisheries Commission requests that the Scientific Council provide the following information for the 2002 Annual Meeting of the Fisheries Commission for stocks under its responsibility requiring advice for 2003, or 2003 and 2004:
  - a) the limit and target precautionary reference points described in Annex II of the UN Fisheries Agreement indicating areas of uncertainty (when precautionary reference points cannot be determined directly, proxies should be provided);
  - b) information including medium term considerations and associated risk or probabilities which will assist the Commission to develop the management strategies described in paragraphs 4 and 5 of Annex II in the Agreement;
  - c) information on the research and monitoring required to evaluate and refine the reference points described in paragraphs 1 and 3 of Annex II of the Agreement; these research requirements should be set out in the order of priority considered appropriate by the Scientific Council;
  - d) any other aspect of Article 6 and Annex II of the Agreement which the Scientific Council considers useful for implementation of the Agreement's provisions regarding the precautionary approach to capture fisheries;
  - e) propose criteria and harvest strategies for re-opening of fisheries and for new and developing fisheries; and
  - f) to work toward the harmonization of the terminology and application of the precautionary approach within relevant advisory bodies.
  
5. In addition, the following elements should be taken into account by the Scientific Council when considering the precautionary approach:
  - a) Many of the stocks in the NAFO Regulatory Area are well below any appreciable level of  $B_{lim}$  or  $B_{buf}$ . For these stocks, the most important task for the Scientific Council is to inform on how to rebuild the stocks. In this context and building on previous work of the Scientific Council in this area, the Scientific Council is requested to evaluate various scenarios corresponding to recovery plans with timeframes of 5 to 10 years, or longer as appropriate. This evaluation should provide the information necessary for the Fisheries Commission to consider the balance between risks and yield levels, including information on the consequences and risks of no action at all.

References to "risk" and to "risk analyses" should refer to estimated probabilities of stock population parameters falling outside biological reference points.

- b) Where reference points are proposed by the Scientific Council as indicators of biological risk, they should be accompanied by a description of the nature of the risk incurred if the reference point is crossed (e.g. short-term risk of recruitment overfishing, loss of long-term yield, etc.)
- c) When a buffer reference point is proposed in order to maintain a low probability that a stock, measured to be at the buffer reference point may actually be at or beyond the limit reference point, the Scientific Council should explain the assumptions made about the uncertainty with which the stock is measured, and also the level of 'low probability' that is used in the calculation.
- d) Wherever possible, short and medium term consequences should be identified for various exploitation rates (including no fishing) in terms of yield, stability in yield from year to year, and the risk or probability of moving the stock beyond  $B_{lim}$  or  $B_{buf}$ . Whenever possible, this information should be cast in terms of risk assessments relating fishing mortality rates to the risks of falling below  $B_{lim}$  and  $B_{buf}$ , as well as of being above  $F_{lim}$  and  $F_{buf}$ , the risks of stock collapse and recruitment overfishing, as well as the risks of growth overfishing and the consequences in terms of both short and long term yields.

- e) When providing risk estimates, it is very important that the **time horizon** be clearly spelled out. By way of consequence, risks should be expressed in timeframes of 5, 10 and 15 years (or more), or in terms of other appropriate year ranges depending on stock specific dynamics. Furthermore, in order to provide the Fisheries Commission with the information necessary to consider the balance between risks and yield levels, each harvesting strategy or risk scenario should include, for the selected year ranges, the risks and yields associated with various harvesting options in relation to  $B_{lim}$  ( $B_{buf}$ ) and  $B_{target}$ , and  $F_{lim}$  ( $F_{buf}$ ) and  $F_{target}$ .
6. For squid (*Illex*) in Subareas 3 and 4, the Scientific Council is encouraged to further analyze available data toward developing possible indicators that could be used under an in-season management regime.
  7. The Fisheries Commission, with the concurrence of the Coastal State, requests that the Scientific Council comment on the possible relationship of witch flounder in 2J3KL to that reported as caught in Div. 3M based on examination of all survey and biological data available.
  8. Regarding pelagic *S. mentella* redfish in NAFO Subareas 1-3, the Scientific Council is requested to review the most recent information on the distribution of this resource, as well as on the affinity of this stock to the pelagic redfish resource found in the ICES Sub-area XII, parts of SA Va and XIV and to the shelf stocks of redfish found in ICES Sub-areas V, VI and XIV, and NAFO Subareas 1-3.
  9. With regard to shrimp in Divisions 3LNO, the Fisheries Commission, with the concurrence of the Coastal State, requests that the Scientific Council, in advance of the September 2002 Annual Meeting, provide information on the geographical distribution of this resource including the relative and seasonal distribution inside and outside the NAFO Regulatory Area by both Division and age group. With reference to the proposed closed area in the region of the South East Shoal in Div. 3N as referenced in FC Working Paper 02/10, Scientific Council is further requested to provide information on the abundance and distribution of shrimp in the area proposed for closure.